

5.12 Soils

This section presents a discussion of potential soils issues associated with the Project. The section discusses applicable LORS and existing conditions at the Amended Project plant site and at the offsite injection well pads, injection pipeline routes, and borrow site. The section also examines baseline soils conditions, potential environmental impacts, and mitigation measures to minimize impacts to soils during Project construction and operation.

Because the transmission lines that will interconnect the Project with the regional grid already have been licensed, and because the Amended Project does not propose changes to the transmission lines, transmission line route soils are not addressed in this Amendment Petition.

5.12.1 Summary of Differences between the Amended Project and Original SSU6

There are no major changes to the affected environment of soil resources from the original project. The reconfiguration of Amended Project facilities (relocation of offsite injection facilities, expanded plant site, and a new borrow site) compared to the original project, leads to minor changes in the soil resources affected. Due to the relocation of the production well pads to the plant site, the soil type Torriorthents-rock outcrop complex, 5 to 60 percent slopes, will be avoided; no new soil types will be affected.

The Amended Project also will result in no significant changes in impacts to soil resources compared to the original SSU6 project. Cut and fill quantities have changed minimally. For the Amended Project, approximately 183,000 cubic yards of cut and 362,000 yards of fill are estimated to be required to achieve final grade, an increase from the estimated 105,000 cubic yards of cut and 287,000 cubic yards of fill for the original SSU6 project. Fill will be obtained offsite from a borrow site located southeast of the plant site to the south of the existing Vulcan geothermal facility (see Figure 5.12-1). Additional fill will be procured from an existing borrow area operated by the Applicant.

5.12.2 LORS Compliance

This section addresses the LORS applicable to soils that are relevant to the Project. Table 5.12-1 and the following text summarize the LORS that are expected to apply to the Project.

Table 5.12-1 LORS Applicable to Soils

LORS	Applicability	Where Discussed in AP
Federal:		
None applicable.		
State:		
California Porter Cologne Water Quality Act	A National Pollution Discharge Elimination System (NPDES) California General Activities Construction Permit is necessary if an area greater than one acre will be disturbed. Industrial facilities (including power plants) with potential to affect storm water discharges are required to obtain an NPDES permit during operation (Industrial Storm Water General Permit).	Section 5.12.3
Williamson Act	The Act creates an arrangement whereby private landowners contract with counties and cities to voluntarily restrict land to agricultural and open space uses.	Section 5.7.3
Local:		
Imperial County Land Use Ordinance, Title 9, Division 3, Chapter 1, Section 90301.02, 90301.03; Chapter 2, Section 90302.13	The County requires that dust control measures be implemented during construction and grading activities.	Section 5.12.3
Imperial County Land Use Ordinance, Title 9, Division 10, Chapter 10	Imperial County's grading ordinance incorporates regulations pertaining to excavation, grading and construction.	Section 5.12.3
Imperial County Land Use Ordinance, Title 9, Division 16, Chapter 3, Section 90603.00, Chapter 4, Section 91604.00; Chapter 5, Section 91605.04	This chapter identifies development permit requirements for special flood hazard areas.	Section 5.12.3
Imperial County Air Pollution Control District Regulation VIII, Rules 800 through 806 - Requirements for Control of Fine Particulate Matter (PM10)	Regulation VII limits fugitive emissions from certain bulk storage, earthmoving, construction and demolition, and man-made activities contributing to wind erosion.	Section 5.2.3 (Air Quality)

5.12.2.1 Federal LORS

There are no Federal soil LORS that apply to the Amended Project.

5.12.2.2 State LORS

Porter-Cologne Water Quality Control Act

Because the Project will disturb greater than one acre of land, it will require an NPDES California General Construction Activity Storm Water Permit before discharging any storm water (see also Section 5.17, Water Resources). Among other things, this permit requires the management of erosion and soil movement. In addition, industrial facilities in California with the potential to impact storm water discharges during operations are required to obtain an NPDES Permit Industrial Storm Water General Permit (SWRCB Order 97-03 DWQ) to ensure proper management and reduction of potential pollutants in runoff resulting from those operations. However, because power plants are exempt from coverage under the General NPDES storm water permit during operation (SWRCB, 1993), and because all runoff at the Project site will be contained on site, no operation phase NPDES permit will be required.

The Williamson Act

The Williamson Act was passed by the California Legislature in 1965 to preserve agricultural and open space lands by discouraging premature and unnecessary conversion to urban uses. The Act creates an arrangement whereby private landowners contract with counties and cities to voluntarily restrict land to agricultural and open-space uses. See Section 5.7, Land Use for discussion regarding Project components located on lands under Williamson Act contracts.

5.12.2.3 Local LORS

Imperial County Land Use Ordinance, Title 9, Division 3, Chapter 1, Section 90301.02, 90301.03; Chapter 2, Section 90302.13

This ordinance requires that dust control measures be implemented during construction and grading activities. It requires submittal of a Plot Plan to the Imperial County Planning/Building Department for approval before obtaining a grading permit. The Plot Plan must include a map showing graded topography. Upon approval of the Plot Plan, a Grading Plan must be submitted that includes a topographic map showing sloped areas. This ordinance also establishes that a Soils Report may be required, which includes soil infiltration, soil texture test, cation exchange capacity, and soil fertility test.

The Project would comply with the grading plan requirements through the California Energy Commission (CEC) review process. The grading and drainage plans for the Project would incorporate best management practices (BMPs) and appropriate grading techniques to control fugitive dust emissions and minimize erosion.

Imperial County Land Use Ordinance, Title 9, Division 10, Chapter 10

Imperial County's grading ordinance incorporates regulations pertaining to excavation, grading, and construction. This section of the ordinance also identifies procedures and requirements for applying for a construction permit.

Application for a permit must include drainage systems, protective devices, and existing and proposed elevations. Permit Conditions establish that 1) proposed grading, excavation, or earthwork will not cause said land to be unfit of agricultural use; 2) the depth of grading, excavation, or earthwork will not preclude

the use of drain tile in irrigated lands; and 3) the grading, excavation, or earthwork construction cannot extend below the water table of the immediate area.

The Applicant will comply with the ordinance requirements through the CEC review process. Imperial County also intends to amend the Conditional Use Permit it issued (and amended in 2005) for the original SSU6 project or issue a new Conditional Use Permit for the Amended Project (see Section 5.7, Land Use). The grading and drainage plans for the Project will incorporate BMPs and appropriate grading techniques to minimize impacts of required grading activities. Grading plans would implement erosion control measures for construction and a permanent storm water drainage plan. The site will be bermed and no storm water will be allowed to leave the site during the Project's operation phase.

Imperial County Land Use Ordinance, Title 9, Division 16, Chapter 3, Section 90603.00, Chapter 4, Section 91604.00; Chapter 5, Section 91605.04

This chapter identifies development permit requirements for special flood hazard areas. Chapter 3, Section 91603.00 establishes that this ordinance applies to all areas of special flood hazards (including lands around the Salton Sea lying at or below the 220-foot elevation contour) within the jurisdiction of Imperial County. Chapter 4, Section 91604.00 identifies Development Permit requirements for special flood hazard areas. Application for a Development Permit shall be made on forms furnished by the Floodplain Administrator and may include, but not be limited to, plans in duplicate drawn to scale showing the nature, location, dimensions, and elevations of the area in question; existing or proposed structures, fill, storage or materials, drainage facilities; and the Project location. Chapter 5, Section 91605.04 establishes that areas of special flood hazard are areas designated as floodways. This section requires that a registered Engineer must demonstrate that placed fill will not increase flood levels during an occurrence of base flood levels.

Proposed drainage facilities for storm water runoff and flood overland flow will be submitted for review and approval through the CEC review process.

Imperial County Air Pollution Control District (ICAPCD) Regulation VIII, Rules 800 through 806 - Requirements for Control of Fine Particulate Matter (PM10)

The purpose of this regulation is to reduce the amount of fine Particulate Matter (PM10) entrained in the ambient air as a result of emissions generated from anthropogenic (man-made) Fugitive Dust (PM10) sources generated from within Imperial County by requiring actions to prevent, reduce, or mitigate PM10 emissions. The Rules contained within this Regulation have been developed pursuant to U.S. Environmental Protection Agency guidance for Serious PM10 Non Attainment Areas.

The Applicant will comply with the Regulation by implementing BMPs to minimize wind erosion, as described in the preliminary Drainage, Erosion, and Sediment Control Plan (DESCP) provided in Appendix J.

5.12.2.4 Involved Agencies

The agency and person to contact for grading permits are identified in Table 5.12-2.

Table 5.12-2 Agencies and Agency Contacts

Contact	Phone/E-mail	Permit/Issue
John Carmona Water Quality Control Board Colorado River Basin Region 73-720 Fred Waring Drive, Suite 100 Palm Desert, CA 92260	760-340-4521 JCarmona@waterboards.ca.gov	NPDES Permit governing Storm Water Discharges Associated with Construction Activity for any disturbance of greater than one acre and for industrial activities.
Jurg Heuberger Director Imperial County Planning/ Building Department	760-482-4238 jurgheuberger@co.imperial.ca.us	Grading, Construction, and Development Permit
Brad Poiriez Air Pollution Control Officer Imperial County Air Pollution Control District 150 S. 9 th Street El Centro, CA 92243	(760) 482-4606 bradpoiriez@imperialcounty.net	Compliance with IPAPCD Regulation VIII

5.12.2.5 Required Permits and Permit Schedule

Table 5.12-3 describes required soils-related permits.

Table 5.12-3 Permits Required and Permit Schedule

Permit/Approval	Schedule
California General Permit for Storm Water Discharge Associated with Construction (NPDES Permit)	A Notice of Intent application will be submitted 30 days prior to the start of construction.
Imperial County Grading Permit	Before Project construction.
Imperial County Construction Permit	Before Project construction.
Imperial County Development Permit	Before Project construction.

5.12.3 Affected Environment

This subsection discusses baseline soil conditions at the Project site. Physical soil properties and the potential for contaminated soils are discussed. This section draws heavily on the discussion of soil conditions provided in the original SSU6 AFC, but also covers the areas newly added to the Project footprint.

5.12.3.1 Regional Setting

Imperial County is a rural agricultural county in the southern portion of the Imperial Valley. The region has a long growing season and low precipitation (approximately 2.8 inches per year). Precipitation occurs primarily from mid-fall to mid-spring. Summers are long and hot; winters are mild. Imperial County is a

leading agricultural area because of both environmental and cultural factors (Imperial County Planning and Building Department, 1993).

The Imperial Irrigation District (IID) water service area is generally level, with low levels of natural erosion. Erosion is dependent on topography, soil texture (i.e., clay, sand, or silt content) and moisture content, and agronomic practices (e.g., cropped, fresh-tilled, or fallow). Lacustrine basin soils in the IID water service area are formed on nearly level old lakebeds near prehistoric Lake Cahuilla. These soils generally consist of silty clays, silty clay loams, and clay loams; are deep and highly calcareous; and usually contain gypsum and soluble salts. The central areas in the IID water service area generally have fine textured silts, which are primarily used for crops. Soils within Imperial County have no potential for farming unless irrigated due to the dry climate. Continued agricultural use of soils within the IID water service area requires both irrigation and installation of subsurface tile drains to carry away water and salts that would have otherwise built up in the soils and prevented crop growth. Tile drains discharge irrigation water to surface drains.

5.12.3.2 Project Site and Vicinity

The Project is underlain by soil mapping units formed primarily on flood plains and alluvial basin floors and generally composed of very deep soils with slow percolation, low permeability, moderate runoff, and low-to-high shrink-swell potential (USDA-SCS, 1981). Because of extensive irrigation, the Project's proximity to the Salton Sea, and the adjacent drainage canal to the west, a shallow water table is often present at depths of 36 to 60 inches, and can rise to a depth of 18 inches during periods of heavy irrigation.

The majority of the Project site is irrigated agricultural land. The Project affects areas designated as Prime Farmland or Farmland of Statewide Importance. For more detailed discussion of agricultural resources, please refer to Section 5.7, Land Use.

A soils map for the Project area is provided as Figure 5.12-1. The two soil types found at the plant site are the Imperial-Glenbar Silty Clay Loams (wet) and Holtville Silty Clay (wet). The Imperial-Glenbar Silty Clay Loams (wet) are moderately well drained, and water movement in the most restrictive layer is moderately high. This soil type is susceptible to moderate-to-high water erosion and moderate wind erosion. Holtville Silty Clay (wet) has moderate-to-high water erosion and moderate wind erosion potential. Water movement for the most restrictive layer is low for this soil type. This soil type is neither flooded nor ponded (U.S. Department of Agriculture, Soil Conservation Service [USDA-SCS], 1981).

Soil types found at the injection well pads and along the injection pipeline right of ways (ROWs) are Imperial Glenbar Silty Clay Loams (wet), Holtville Silty Clay (wet), Glenbar Clay Loam (wet), and Indio Loam (wet) (USDA-SCS, 1981). Soil characteristics including depth, texture, drainage, permeability, and erosion hazard of soils at the Project site are included in the Table 5.12-4.

Table 5.12-4 Soil Description for the Project site and Linear Facilities

Soil Map Unit Name	Unit Soil Description	Slope %	Depth to Bedrock (inches)	Water Erosion (K factor)	Wind Erosion	Location
Glenbar Clay Loam, wet	Nearly level, very deep soils formed in alluvial sediment on flood plains and in alluvial basins within irrigated areas. Irrigation has caused a perched water table at a depth of 36 to 60 inches, and the water can rise to a depth of 18 inches during periods of heavy irrigation. Soil is pinkish gray clay loam from 0 to 13 inches and is stratified, light brown clay loam, and silty clay loam from 13 to 60 inches. Strata of silty clay may occur between 10 and 60 inches; or a thick stratum of silt loam or very fine sandy loam may occur between 20 to 36 inches.	0-2	> 60	Moderate (0.37)	Moderate (4L)	Injection OB-2 Pipeline, Injection OB-3 Pipeline, Borrow Site
Holtville Silty Clay, wet	Nearly level, very deep stratified soil formed in alluvial sediment on flood plains and alluvial basin floors. Irrigation has caused a perched water table at a depth of 36 to 60 inches, and the water table can rise to within 18 inches of the surface during periods of heavy irrigation. Soil is light brown silty clay from 0 to 17inches, light brown to very pale brown silty clay and silt loam from 17 to 18 inches, and very pale brown loamy very fine sand from 18 to 60 inches, with sandy material below 60 inches in some areas.	0-2	> 60	Moderate to High (0.28-0.43)	Moderate (4)	Plant Site, Injection OB-2 Well Pad, Injection OB-3 Well Pad, Production OB-2 Well Pad, Production OB-3 Well Pad, Injection OB-1 Pipeline, Injection OB-2 Pipeline, Injection OB-3 Pipeline, Production OB-2 Pipeline, Borrow Site
Imperial-Glenbar Silty Clay Loams, wet, 0 to 2 percent slopes	Nearly level, very deep calcareous soils formed in alluvial deposits on flood plains and lakebeds within the irrigated areas of Imperial Valley. Irrigation has caused a perched water table commonly at a depth of 36 to 60 inches, but which can rise to a depth of 18 inches during periods of heavy irrigation. This map unit averages about 40 percent Imperial silty clay loams and 40 percent Glenbar silty clay loams.	0-2	> 60	Moderate to High (0.37 to 0.43)	Moderate (4 and 4L)	Plant Site, Production OB-1 Well Pad, Production OB-3 Well Pad, Injection OB-1 Pipeline, Injection OB-2 Pipeline, Injection OB-3 Pipeline, Production OB-1 Pipeline, Production OB-2 Pipeline, Production OB-3 Pipeline, Borrow Site

Table 5.12-4 Soil Description for the Project site and Linear Facilities

Soil Map Unit Name	Unit Soil Description	Slope %	Depth to Bedrock (inches)	Water Erosion (K factor)	Wind Erosion	Location
Indio Loam wet	Nearly level, very deep soils formed in alluvium and eolian sediments on flood plains and basin floors. Irrigation has caused a perched water table commonly at a depth of 36 to 60 inches, but which can rise to a depth of 18 inches during periods of heavy irrigation. Soil is a pinkish gray loam from 0 to 12 inches, and stratified, very pale brown and pink light silt loam and loamy very fine sand from 12 to 60 inches or more. In some places the surface layer is silt loam, very fine sandy loam, or fine sandy loam, or there is silty clay at a depth between 40 and 60 inches.	0-2	> 60	High (0.49 - 0.55)	Moderate (4L)	Injection OB-1 Well Pad, Injection OB-3 Well Pad, Injection OB-1 Pipeline, Injection OB-3 Pipeline
Source: USDA-SCS, 1981						

5.12.4 Environmental Impacts

Environmental impacts associated with the construction and operations of the Project are discussed in the following sections.

Significance criteria were developed based on California Environmental Quality Act of 1970 (CEQA) Guidelines and evaluated using professional judgment. Impacts would be considered significant if:

- Substantially increased wind- or water-induced soil erosion occurred as result of Project construction or operation,
- Substantially increased sedimentation occurred in areas adjacent to construction areas, or
- Construction activities were to occur in areas of high erosion susceptibility and the disturbed areas were left exposed and not properly stabilized.

The assessment of Project impacts to the soil resource is based on soils information presented in the published soil survey information covering the Project area (USDA-SCS, 1981) and consideration of the Applicant-committed mitigation measures. The Project area soil conditions include nearly level topography and extensive actively farmed agricultural areas.

5.12.4.1 Construction

Construction related impacts from plant site activities to soil resources primarily involve vegetation removal, top soil stripping and excavation, grading, and temporary stockpiling of soil material. The proposed improvements include excavation for three brine ponds (636 feet long, 58 feet wide, and 7.5 feet deep with two feet freeboard); the construction of an earthen berm with a top elevation of 220 feet below mean sea level (msl) and 2:1 side slopes; a 3.5-foot-deep storm water detention basin with a surface area of approximately 112,500 square feet; and minor grading for building pads, utilities, and for drainage of surface water flow.

The existing site topography is generally level, but some cut and fill will be required to provide a level area for the facility at about an average elevation of 225 feet below msl. Approximately 187,200 cubic yards of cut and 362,000 cubic yards of fill will be required to achieve final grade. Typical cut and fill depths of less than two to three feet are anticipated. Fill will be obtained offsite from a new borrow site (Vulcan 1 borrow site), located immediately southeast of the plant site and from an existing borrow site, located adjacent to the existing Leathers geothermal plant, less than two miles northeast of the plant site. See Section 2.0, Project Description for more discussion on the borrow sites.

Areas to be backfilled will be prepared by removing unsuitable materials and rocks. The bottom of an excavation will be examined for loose or soft areas. Such areas will be excavated fully and backfilled with compacted or soil modified fill. Ground improvement operations to mitigate the site for settlement sensitive improvements are discussed in Section 5.5, Geological Hazards. Topsoil removed from the plant site will be segregated and stockpiled at a site located adjacent to the west of the proposed borrow site discussed above. After the necessary fill material has been procured from the borrow site, the stockpiled topsoil will be used to backfill the borrow site. Thus, the borrow site will be returned to conditions approximating those currently present.

Construction-related impacts to soil resources associated with development of the three production and three injection well pads primarily involve grading operations and drilling geothermal wells. The production wells pads will average 6.6 acres each in size (approximately 19.8 acres total) and will be located within the plant site. The offsite injection well pads will range will have an average size of 4.7 acres (approximately 14.1 acres total). Class 2 road base material will be used for an access road to the well pads and for the final surface material at each of the well pads. Wells will be directionally drilled and completed to minimize the well pad size, thereby minimizing surface disturbance.

Construction-related impacts associated with development of the injection and production well pipelines primarily involve grading operations and ground improvement operations for foundation support. One hundred-ten-foot-wide ROWs will be required for the length of each injection pipeline (production pipelines are located within the plant site and do not require additional ROWs). Construction and lay-down areas would be located within the ROWs. Most of the ROWs parallel existing roads. Previously disturbed areas will be used during construction to the maximum extent practical. The expected disturbance related to construction of the proposed offsite injection pipelines is approximately 39.3 acres.

Generally, impacts during construction of the Project on soil resources include alteration of the existing soil profile and increased soil erosion and soil compaction. Alteration of the existing soil profiles, including mixing of soils and rock, will alter the physical, chemical, and biological characteristics of the native soils and underlying geology. Clearing of the protective vegetative cover and subsequent soil disturbance will likely result in short-term increases in water and wind erosion rates. Water related erosion is anticipated to be minimal due to the arid nature of the area in which the Project is located. Soil erosion causes the loss of topsoil; however, because storm water will be contained on site via a basin, surface receiving waters downstream of the plant site will not be impacted. Soil compaction can decrease infiltration rates, resulting in increased runoff and erosion rates. The magnitude, extent, and duration of construction-related impacts depend on the erodibility of the soil, the proximity of the construction activity to receiving waters, and the construction methodologies, duration, and season. The flat topography and series of berms and levies in the Project area would limit soil erosion to minor or moderate. For the well pads, the proposed improvements include the construction of raised earthen berms, excavation of mud pits, and minor grading for well pads and construction of an access road.

With the implementation of mitigation measures outlined in Section 5.12.6, impacts would be reduced to a less than significant level.

Water Erosion

The soils on the Project site have moderate to high hazard for water erosion. BMPs to minimize water erosion, as described in the preliminary DESCP in Appendix J, will include the following:

- Local soil berms and a detention area will be constructed to contain storm water runoff.
- During site grading, clearing and grubbing will be confined to only those areas needed for facility construction as indicated in the conceptual grading plan.

The soil berms and detention pond will be created at the beginning of plant construction, ensuring that there will be only negligible, if any, water erosion soils losses due to construction. BMPs will be applied and repaired as soon as erosion is evident and as soon as possible. Temporary erosion control measures will

be implemented as needed to control erosion. Temporary sediment control materials will be maintained onsite during construction so as to respond as needed to unexpected events or emergencies.

Wind Erosion

The soils on the plant site have a moderate hazard for wind erosion. Wind erosion soil loss due to construction activities at the plant site can be estimated using fugitive dust emissions data (see Section 5.2, Air Quality). These data, calculated using Urbemis 2007 software, indicate that total PM10 dust emissions due to plant construction activities would be approximately 57.3 tons without the use of BMPs. With the use of BMPs, as described in the preliminary DESCP (Appendix J), total PM10 dust emissions for construction are expected to be approximately 9.4 tons.

5.12.4.2 Operation

The plant site will be surrounded by a berm whose top elevation will be 220 feet below msl, in conformance with the County's flood protection requirement. The plant site will be covered with the facility structures/equipment, concrete, asphalt, and/or crushed stone. The perimeter berm and interior storm water detention pond are expected to control potential flooding events at the site (refer to Section 5.17, Water Resources for more discussion on storm water management). The erosion control and post-construction monitoring mitigation measures outlined in Section 5.12.5 would reduce impacts to soil resources from plant operations to a less than significant level. Therefore, no impacts to soil resources are anticipated from operations at the plant site.

The Wind Erosion Prediction System (WEPS) program, a standard method provided by the USDA-NRCS, was used to calculate pre- and post-construction soil loss due to wind erosion. This program calculates the total soil loss from wind erosion using climate, wind, soil, and site management data. Pre-construction (i.e., existing) wind erosion soil loss was estimated at 1,043 tons per year. After Project construction, only 63 percent of the site's area will be left uncovered and exposed to wind. The berm around the site will help reduce the soil loss due to wind. These factors were included in the parameters for calculating soil loss. With implementation of BMPs, as described in the preliminary DESCP (Appendix J), post-construction wind erosion soil loss was estimated at 320 tons per year, a 69 percent reduction from existing conditions. Full results of the WEPS erosion modeling are provided in Appendix K. Soil loss due to water erosion during the operational phase of the Project is also expected to be insignificant and less than that under existing conditions, due to the construction of the soil berm, storm water detention pond, and other BMPs.

The facility will be equipped with a self-contained septic system that will be periodically pumped out by a qualified contractor. No leach fields will be constructed; therefore, the Project will not cause any impacts associated with soils incapable of supporting a proposed septic system.

Potential impacts during operation of the plants linear facilities on soil resources include increased erosion because of decreased infiltration rates, increased runoff rates, and increased soil compaction. Following construction, the ROW along pipelines will be allowed to naturally re-vegetate, or be developed as agricultural fields, as applicable. The well pads will be treated with soil cement to stabilize them for the drilling rigs. With implementation of the mitigating measures contained in the Conditions of Certification (COC) presented in Section 5.12.6, impacts to soil resources from operation of the well pads would be less than significant.

5.12.4.3 Impacts of Power Plant Emissions

Operation of the Project will expose soils and vegetation near the plant facility to slightly increased levels of air pollutants. These emissions would not adversely impact plant habitats. Considering that the surrounding agricultural crops are typically rotated at least twice a year, the short residency time of the agricultural crops will decrease the likelihood of significant absorption of air pollutants as compared to native plants. Based on the type of emissions, the short residency time of the surrounding vegetation, and the implementation of the emission control devices, impacts to the soil vegetation system from Project emissions would be less than significant.

5.12.4.4 Cumulative Impacts

With the implementation of measures to control erosion and sedimentation, including good construction practices and the mitigation measures described below, the Project would have minimal impacts on soil conditions. A berm surrounding the entire plant site will prevent storm water runoff from leaving the site, thereby avoiding potential downstream erosion and sedimentation. Other projects in the area would be required to comply with the same soil- and water quality-related regulatory programs (e.g., NPDES permits, grading ordinances), and would be expected to control erosion under these regulations. Thus, the cumulative soils impacts in the general area would be expected to be less than significant. The Project would have no significant impacts on the agricultural resources of the area.

5.12.5 Mitigation Measures

Soils mitigation measures are embodied in the CEC's Conditions of Certification (COC) for the original project. These COC have been adopted and modified by the Applicant to make them appropriate for the Amended Project in the following section.

5.12.6 Conditions of Certification

The Commissions' Decision contained Conditions of Certification (COC) for soil resources in the Soils & Water Resources section. Only the COCs applicable to soil resources is presented here, and COCs applicable to water resources are presented in Section 5.17, Water Resources. Applicant-recommended deletions are shown in ~~strike through~~ mode. The Applicant recommends deletion of SOIL-2. Geothermal power plants are exempt from coverage under the General NPDES storm water permit during operation (SWRCB, 1993). Additionally, the Amended Project will be completed surrounded by a flood control berm and will have an onsite detention basin to manage storm water drainage. For these reasons, no operation phase Storm Water Pollution Prevention Plan (SWPPP) will be needed. The Drainage, Erosion, and Sediment Control Plan (DESCP) required by SOIL-3, however, will cover both construction and operation phases.

SOIL-1 The project owner shall comply with all of the requirements of the General NPDES Permit for Discharges of Storm Water Associated with Construction Activity. The project owner shall develop and implement a Storm Water Pollution Prevention Plan (SWPPP) for the construction of the entire project. Prior to beginning any site mobilization associated with any project element, the project owner shall submit to the CPM a copy of the Notice of Intent for Construction accepted by the Colorado River Basin RWQCB and obtain Energy Commission CPM approval of the construction activity SWPPP for SSU6.

Verification: No later than 60 days prior to the start of site mobilization for any project element, the project owner shall submit a copy of the SWPPP required under the General NPDES Permit for Discharges of Storm Water Associated with Construction Activity to Imperial County for review and comment, and to the CPM for review and approval. The SWPPP will include copies of the Notice of Intent for Construction accepted by the RWQCB and any permits for SSU6 that specify requirements for the protection of storm water or water quality. Approval of the SWPPP by the CPM must be obtained prior to site mobilization for any project element.

SOIL-2: ~~The project owner shall comply with all of the requirements of the General NPDES Permit for Discharges of Storm Water Associated with Industrial Activity. The project owner shall develop and implement a Storm Water Pollution Prevention Plan (SWPPP) for the operation of SSU6. The project owner shall submit to the CPM a copy of the Notice of Intent for Operation accepted by the Colorado River Basin RWQCB and obtain approval of the General Industrial Activities SWPPP from the Energy Commission CPM prior to commercial operation of the SSU6.~~

~~Verification: No later than 60 days prior to the start of commercial operation, the project owner shall submit to the CPM a copy of the SWPPP required under the General NPDES Permit for Discharges of Storm Water Associated with Industrial Activity to Imperial County for review and comment, and to the CPM for review and approval. The operational SWPPP shall include copies of the Notice of Intent for Operation accepted by the RWQCB and any permits for SSU6 that specify requirements for the protection of stormwater or water quality. Approval of the operational SWPPP by the CPM must be obtained prior to start of commercial operation.~~

SOIL-3 Prior to beginning any site mobilization activities for any project element, the project owner shall obtain CPM approval for a site-specific Drainage, Erosion and Sedimentation Control Plan that addresses all project elements. The plan shall address revegetation and be consistent with the grading and drainage plan as required by Condition of Certification CIVIL-1.

Verification: No later than 60 days prior to the start of any site mobilization for any project element, the project owner shall submit the Drainage, Erosion and Sedimentation Control Plan to the CPM for review and approval. No later than 60 days prior to start of any site mobilization, the project owner shall submit a copy of the plan to Imperial County for review and requesting any comments be provided to the CPM within 30 days. The plan must be approved by the CPM prior to start of any site mobilization activities.

5.12.7 References

Imperial County Land Use Ordinance, 1993. Title 9, Divisions 1-23.

Imperial County Planning/Building Department, 1993. Imperial County General Plan, November.

State Water Resources Control Board, 1993. Storm Water Permit: Geothermal Power Plants. Memorandum from Elizabeth Miller Jennings, Senior Staff Counsel, Office of the Chief Counsel, State Water Resources Control Board to Archie Matthews, Division of Water Quality. February 23.

5.12 Soils

U.S. Department of Agriculture, Soil Conservation Service (USDA-SCS), 1981. Soil Survey of Imperial County California, Imperial Valley Area.



See Mapsheet 2 of 2

Soil Symbol	Soil Name			
104	FLUVAQUENTS, SALINE	Plant Site	Proposed Well Pad	Soil Unit Boundary
106	GLENBAR CLAY LOAM, WET	Borrow Site	Proposed Pipeline	
110	HOLTVILLE SILTY CLAY, WET			
114	IMPERIAL SILTY CLAY, WET			
115	IMPERIAL-GLENBAR SILTY CLAY LOAMS, WET, 0 TO 2 PERCENT SLOPES			
118	INDIO LOAM, WET			
140	TORRIORTHENTS-ROCK OUTCROP COMPLEX, 5 TO 60 PERCENT SLOPES			
144	VINT AND INDIO VERY FINE SANDY LOAMS, WET			
145	WATER			

Source: NRCS Web Soil Survey 2008
1 inch = 2,000 feet

0 1,000 2,000 4,000 Feet



Amended SSU6 Project

Figure 5.12-1 Soils

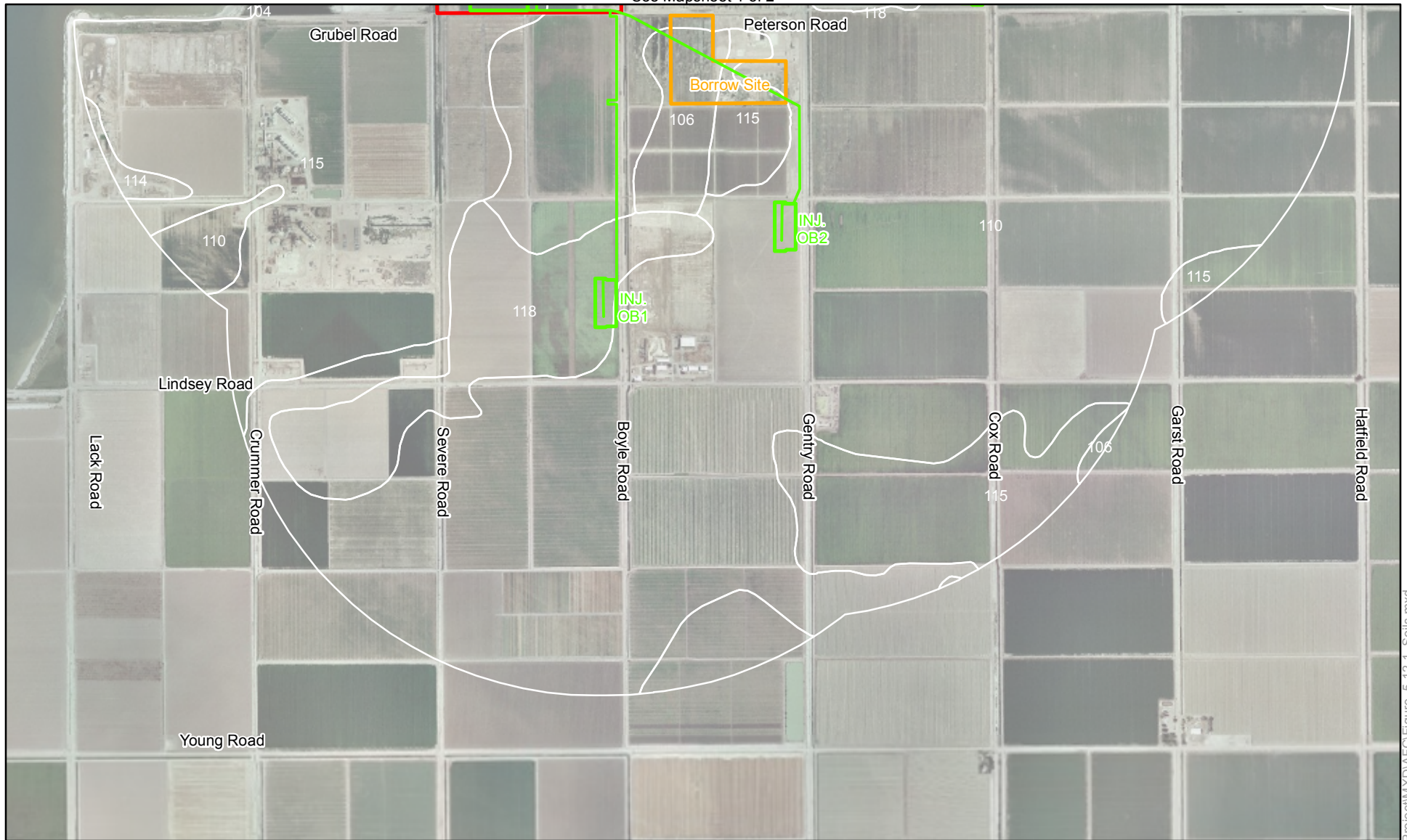
Mapsheet 1 of 2



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Soil Symbol	Soil Name	Plant Site	Borrow Site	Proposed Well Pad	Proposed Pipeline	Soil Unit Boundary
104	FLUVAQUENTS, SALINE					
106	GLENBAR CLAY LOAM, WET					
110	HOLTVILLE SILTY CLAY, WET					
114	IMPERIAL SILTY CLAY, WET					
115	IMPERIAL-GLENBAR SILTY CLAY LOAMS, WET, 0 TO 2 PERCENT SLOPES					
118	INDIO LOAM, WET					
140	TORRIORTHENTS-ROCK OUTCROP COMPLEX, 5 TO 60 PERCENT SLOPES					
144	VINT AND INDIO VERY FINE SANDY LOAMS, WET					
145	WATER					

Source: NRCS Web Soil Survey 2008

1 inch = 2,000 feet

0 1,000 2,000 4,000 Feet



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Figure 5.12-1 Soils

Mapsheet 2 of 2



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